

### REMARKS

The Final Office Action of September 7, 2006 has been received and carefully reviewed. The claims stand rejected as obvious in view of Hsu 6,441,342 and a proposed combination of Hsu with Ihde 6,617,549. Claim 11 has been amended above to correct a typographical error wherein "said" was originally misspelled as "aid", and claims 1, 9, 17, 25, 31, 37, 44, 49, 53, and 54 have been amended to further clarify the subject matter of the invention. Applicants note the brief telephonic interview on September 18, 2006, conducted with the Examiner and Applicant's attorney Eric Highman. The discussion included a brief discussion of possible clarifying amendments to independent claim 1 to address the rejections under 35 U.S.C. §103, as well as a discussion of the cited reference Hsu 6,441,342, wherein no agreement was reached on specific claim language. The Applicant proposed to submit a written amendment including proposed clarifying language, which has been included in the above amendments. Applicants note that the above amendments are not narrowing and have not introduced any new matter, whereby entry thereof is requested under 37 CFR §1.116 as presenting the claims in condition for allowance or in better form for consideration on appeal and complying with formal requirements set forth in previous Office Actions, without requiring further searching and without adding new matter. The amended claims are believed to be patentably distinct from the cited references as further clarified by the above amendments and respectfully request reconsideration of the pending claims in view of the above amendments and the following remarks.

**I. REJECTION OF CLAIMS 1-3, 9-11, 17-19, 25, 26, 31, 32, 37, 38, 44-46, 49, 50, 53, AND 54 UNDER 35 U.S.C. §103**

Claims 1-3, 9-11, 17-19, 25, 26, 31, 32, 37, 38, 44-46, 49, 50, 53, and 54 stand finally rejected under 35 U.S.C. §103 as being unpatentable over Hsu 6,441,342. Applicants reiterate the remarks in the previous response of June 19, 2006, and respectfully request reconsideration and withdrawal of these claim rejections as the amended claims patentably distinguish the cited references. The application currently includes independent claims 1, 9, 17, 25, 31, 37, 44, 49, 53, and 54, each of which being rejected as obvious in view of the Hsu reference. In particular, the Office Action references to Figures 1, 9, and 9B and the discussion at column 18, line 44 through column 20, line 39 of Hsu in rejecting these claims, stating that Hsu teaches "clearing an undesired short circuit as shown in figure 9B whereby after a short circuit is detected,

a "clear short" routine is implement at box 312 in the flow chart after which waveform generation is resumed at box 378 by starting the background current." In addition, the Office Action acknowledges that the claims differ from Hsu in calling for a circuit to reset the waveform generator, but asserts that this difference does not patentably distinguish over the prior art. In this regard, Applicants request clarification as to whether the rejections of claim 1 and the other independent and dependent claims are based on a purported teaching of a "circuit to rest" in Hsu or instead are based on a modification of Hsu. Applicants note on this point that the Office Action at page 4 states that "[t]he Hsu operation of interrupting the waveform and returning the output to the background current state is effectively an operation of resetting the waveform." In this regard, Applicants respectfully submit that Hsu does not teach the claimed "circuit to reset" in claim 1. On the other hand, the Office Action acknowledges at page 2 that the claims differ from the teachings of Hsu in calling for the circuit to reset the waveform generator, but no modification of Hsu is proposed, and no motivation, suggestion, and reasonable expectation of success is set forth for attempting such a modification without rendering Hsu inoperative for its intended purpose.

As noted in Applicants' response of June 19, 2006, Hsu fails to teach or otherwise suggest resetting a pulse waveform, but instead proceeds to clear the short and then go to the background current state, which is not resetting the waveform to the starting time. As noted in the current Office Action, moreover, the output waveform in Hsu is periodic, and Applicants submit that this is different from the claimed inventions as further clarified in the above amendment. In this regard, the referenced teachings of Hsu are not an operation of resetting the waveform, whereby Hsu neither teaches nor fairly suggests the reset features set forth in the pending claims. Applicants note that the above amendments to the independent claims are believed to more clearly distinguish the resumption of the background current after short clearing from box 312 to box 378 in Fig. 9B of Hsu from the waveform resetting acts and circuits of the present application. Moreover, the above amendments are not narrowing amendments and have not introduced any new matter. In particular, independent claim 1 above recites an electric arc welder with a waveform generator and a circuit to reset the waveform generator to said starting time to begin a new waveform upon sensing a short circuit. An example of this is illustrated in Applicants' Fig. 7, where the new waveform cycle starts prior to completion of the previous cycle.

The operation shown in Fig. 9B of Hsu does not reset the waveform generator to the starting time, but instead, the *current* waveform cycle of Hsu is *resumed* at box 378 by transitioning to the background current (state 13 at 378 in Hsu Fig. 9B) after performance of a clear short function at 312. This is not resetting the waveform generator to the starting time as set out in independent claim 1. Instead, the waveform generation described in the referenced portion of Hsu performs two actions ("clear short" at 312 and "background" at 378) before the waveform cycle returns to the ramp up state at 370. Applicants note that this type of short-clearing operation is illustrated in Fig. 3 of the current application, where the clearing of a short circuit in Hsu would not appear to affect the periodicity of the waveform. In this regard, the Office Action acknowledges on page 4 that "[t]he waveform in Hsu is periodic". In contrast, resetting the waveform upon sensing a short circuit would generally disturb the waveform periodicity, as shown for example in Applicants' Fig. 7. Therefore, Hsu fails to teach this reset feature of claim 1. As such, to the extent that the Office Action is asserting that this feature is taught by Hsu, reconsideration thereof is requested as the system of Hsu does not include circuitry to reset the waveform generator to the starting time upon sensing a short circuit as in amended claim 1. Furthermore, no modification of Hsu has been proposed in the Office Action, and no motivation, suggestion, or reasonable expectation of success has been identified for attempting any such modification without rendering Hsu inoperative for its intended purpose, whereby reconsideration of claims 1-3 is requested for this reason.

The same is true of the other independent claims 9, 17, 25, 31, 37, 44, 49, 53, and 54 and the corresponding dependent claims, wherein no prima facie case of obviousness has been stated. In this regard, independent claim 9 recites an electric arc welder with a circuit to reset said waveform generator to restart said pulse waveform at the current ramp up portion upon sensing a short circuit. For the same reasons recited *supra*, Applicants submit that Hsu fails to teach or fairly suggest resetting a pulse waveform, but instead proceeds to clear the short and then go to the background current state, which is not resetting the waveform. For at least this reason, claims 9-11 are non-obvious in view of Hsu, whereby reconsideration and allowance thereof is requested under 35 U.S.C. §103.

Independent claim 17 is directed to a method of electric arc welding, including sensing a short circuit between said electrode and said workpiece, and resetting said

waveform generator by starting a next waveform upon sensing a short circuit. As discussed above, there is no teaching of this in Hsu and no suggestion or motivation for modifying Hsu to reset a waveform generator to start a next waveform upon sensing a short has been proposed, whereby Applicants request reconsideration and withdrawal of the rejection of claims 17-19 under 35 U.S.C. §103.

For the same reasons, Applicants submit that Hsu fails to teach or fairly suggest all the elements of the remaining independent claims 25, 31, 37, 44, 49, 53, and 54, and request reconsideration thereof, including no teaching, suggestion, motivation, reasonable expectation of success with respect to the reset circuit to reset said waveform generator to start a new pulse waveform with a new peak current portion upon sensing of a short circuit of claim 25, and dependent claims 25 and 26); method claims 31 and 32 (resetting said waveform generator upon sensing of a short circuit to immediately start a new next waveform beginning at the ramp up portion after a sensed short circuit), claims 37 and 38 (circuit to reset said program to said starting time of the next waveform upon sensing a short circuit), claims 44-46 (circuit to reset said waveform to restart said pulse waveform by beginning a new peak current portion upon sensing a short circuit, claims 49 and 50 (starting a next waveform upon a short circuit without completing said current waveform, independent claim 53 (electric arc welder with a reset circuit to start a new waveform by beginning a new pulse portion upon sensing of a short circuit), and independent method claim 54 (including immediately starting a new next waveform at the starting time after a sensed short circuit).

The Office Action also asserts that it would have been obvious to have limited the detection to one or the other of peak and background current in referring to certain dependent claims, stating that the motivation would be routine engineering consideration such as shortening the execution time of the Fig. 9B algorithm or simplifying this algorithm for certain welding situations by eliminating redundant short circuit checks. However, as pointed out in Applicants' previous response, the referenced portion of Hsu at col. 18, line 44 through col. 20, line 39 acknowledges that various "exceptions" may occur "sporadically" during the weld cycle (Fig. 9; col. 18, lines 57-65), including short circuits, loss-of-arc conditions, and trigger-off conditions. Therefore, a person of ordinary skill in the art would not interpret the short-circuit checks of Hsu as redundant and consequently would not be motivated by the entirety of Hsu to limit the detection to one or the other of peak and background current or any other

specific portion of the weld cycle, particularly since Hsu appears to teach that short circuits may occur at any point in the pulse welding cycle. Thus, for this additional reason, dependent claims 2, 3, 10, 11, 18, 19, 26, 32, 38, 45, 46, and 50 are further patentably distinct from Hsu and reconsideration thereof is requested under 35 U.S.C. §103.

**II. REJECTION OF CLAIMS 4-8,12-16,20-24,27-30, 33-36, 39-43,47,48, 51, 52, AND 55 UNDER 35 U.S.C. §103**

Claims 4-8,12-16,20-24,27-30, 33-36, 39-43,47,48, 51, 52, and 55 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu as applied to claims 1-3, 9-11,17-19,25,26, 31, 32,37, 38,44-46,49, 50, 53, and 54, and further in view of Ihde 6,617,549. Reconsideration and withdrawal of these claim rejections is respectfully requested for at least the following reasons.

As set forth above, the resetting circuits and features of the independent claims are neither taught nor fairly suggested by Hsu. Ihde fails to remedy these deficiencies of Hsu whereby dependent claims 4-8,12-16,20-24,27-30, 33-36, 39-43,47,48, 51, 52, and 55 are patentably distinct from the proposed combination of Hsu with Ihde and reconsideration thereof is respectfully requested under 35 U.S.C. 103 for at least this reason. In this regard, Ihde appears to be cited solely for the purpose of providing alleged motivation for clearing an undesired short circuit by increasing current, wherein the Office Action refers to the abstract of Ihde. In particular, the Office Action asserts that it would have been obvious to implement the "clear short" routine in element 312 of Hsu (6,441,342) using any conventional approach. However, this proposed combination appears to require the operation of Hsu Fig. 9B which employs a separate short-clearing routine 312, and therefore the combination proposed in the Office Action appears to be based on *not* resetting the waveform generator upon detecting a short. Therefore, this proposed combination teaches away from the invention set forth in the independent claims, and thus cannot sustain a rejection of the dependent claims. Reconsideration and withdrawal of the rejections of claims 4-8,12-16,20-24,27-30, 33-36, 39-43,47,48, 51, 52, and 55 is respectfully requested since these claims depend from allowable independent claims 1, 9, 17, 25, 31, 37, 44, 49, and 54, and since there appears to be no motivation for attempting the proposed combination of Hsu and Ihde, and further because neither reference appears to teach or suggest the resetting features of the rejected claims.

**CONCLUSION**

For at least the above reasons, the currently pending claims are believed to be in condition for allowance and notice thereof is requested.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 06-0308, LEEE200414.

Respectfully submitted,

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